

Commercial Considerations: Risk Management

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Business Risk Mitigation

The basic theme of Business Risk Mitigation will be to:

- Envision the future and the role your company wants to contribute**
- Chart the minimum risk path from where you are today, to that future role.**

Future Vision

In the coming 40 years, hydrocarbons will remain (with coal) as one of the most cost effective source of energy.

The Public and Governments will insist that CO₂ discharges in the atmosphere be monitored and controlled.

To continue to use fossil fuels, two steps are required:

**Capture of CO₂ at source,
and Sequestration.**

Business of CO2 Sequestration

If we assume large future CO2 Sequestration, there will be significant activity in:

Separation/Capture

Transport

Sequestration site:

Identification & Evaluation

Drilling

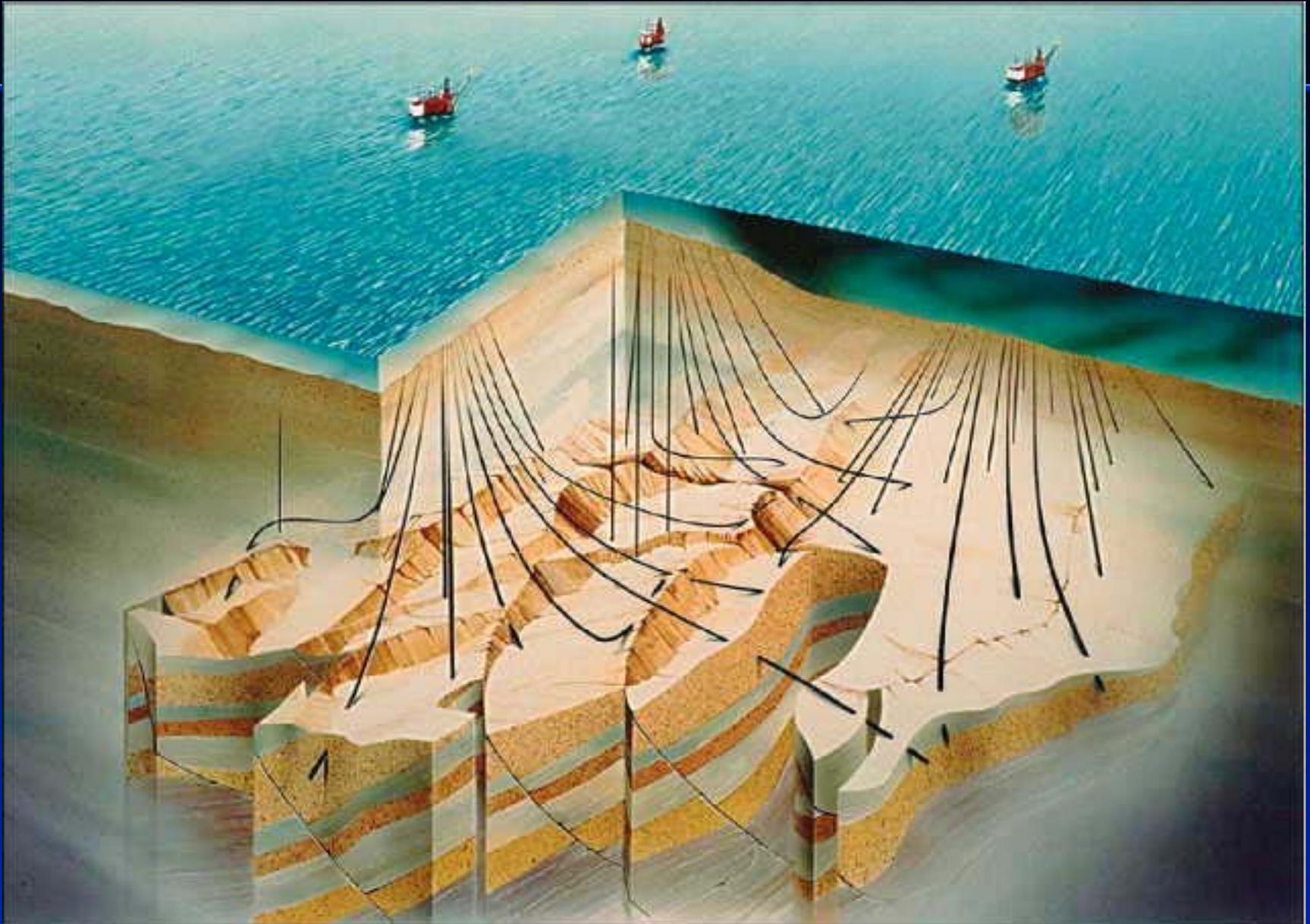
Design & Completion

Monitoring, Maintenance & Remediation

Schlumberger Participation

Much of the process and technology of Geologic Sequestration is currently provided by Schlumberger in the market of Oil and Gas exploration and production.

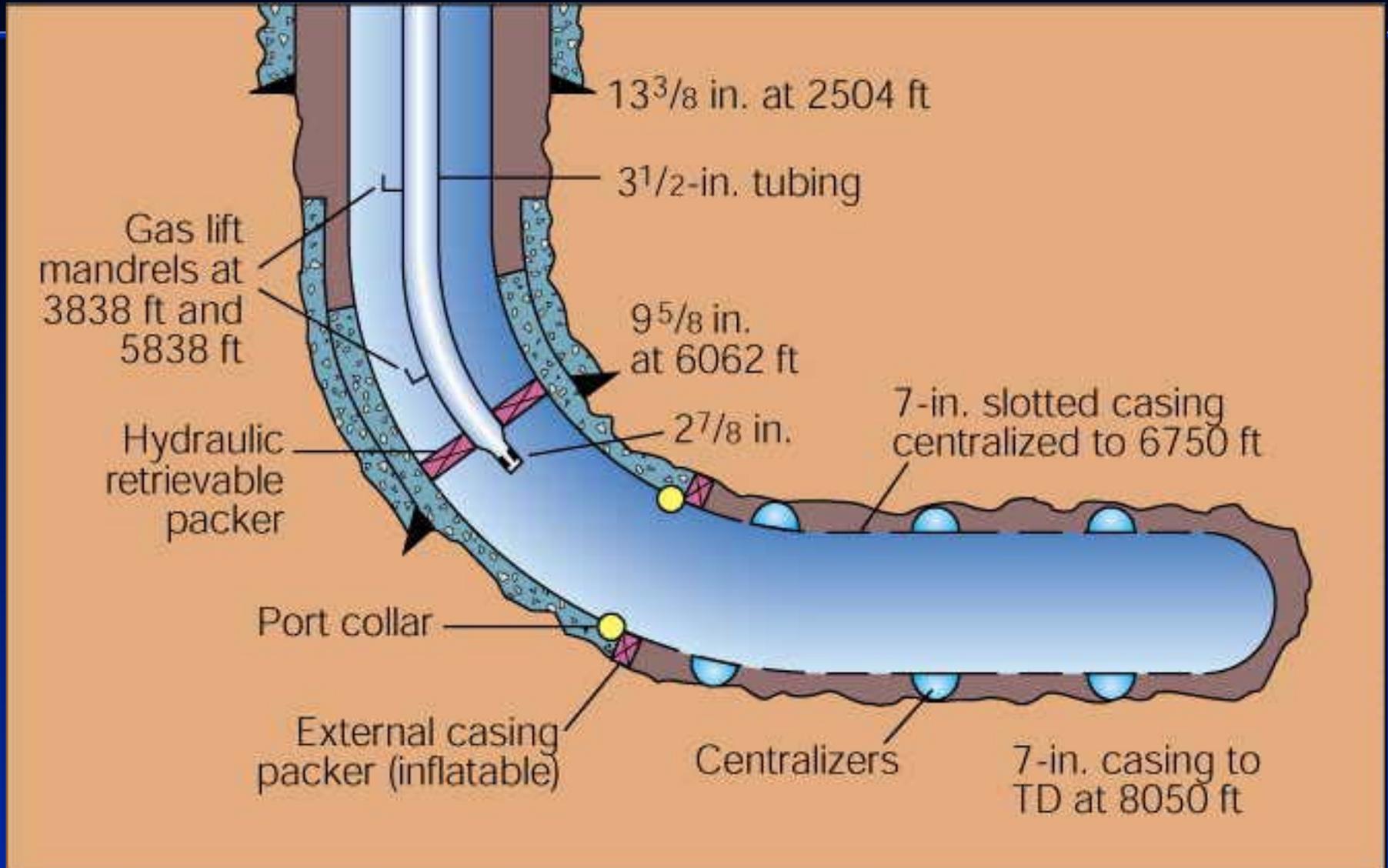
Reservoir



Reservoir Complexity



Reservoir Complexity



Enabling Technology

CO2 sequestration will be the enabling technology for providing low cost energy to society without harming the environment. It is also a business opportunity for us.

Projects we're involved in now.

Path to the future.

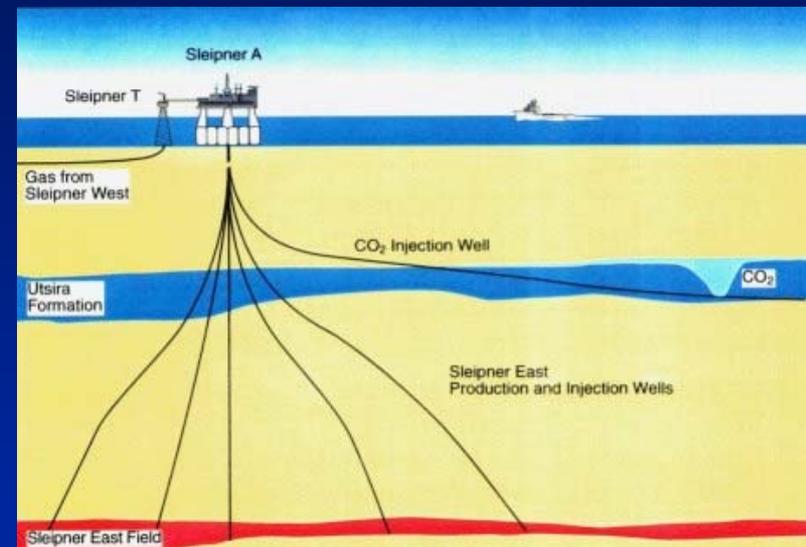
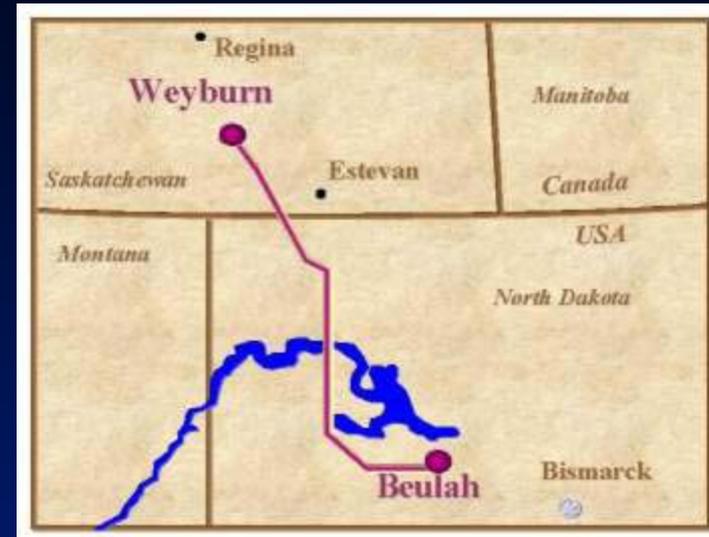
Current Geologic Sequestration

□ Weyburn field

- CO₂ from synfuels plant (N. Dakota)
- Piped across border (2..7 Mm³/day)
- CO₂ enhanced oil recovery / sequestration
- Wireline logging services (Schlumberger)
- 344 MBbl → 466 MBbl, EOR

□ Sleipner field

- Gas from Sleipner West (9% CO₂)
- MEA Absorption / Stripping
- Capture, separate, compress, pump
- Seismics time-lapse (Schlumberger)
- Leakage to upper strata, a concern
- NOK 300 tax / t CO₂, incentive



Stanford Global Climate Energy Project - GCEP

Stanford program with ExxonMobil, GE, Toyota and Schlumberger.

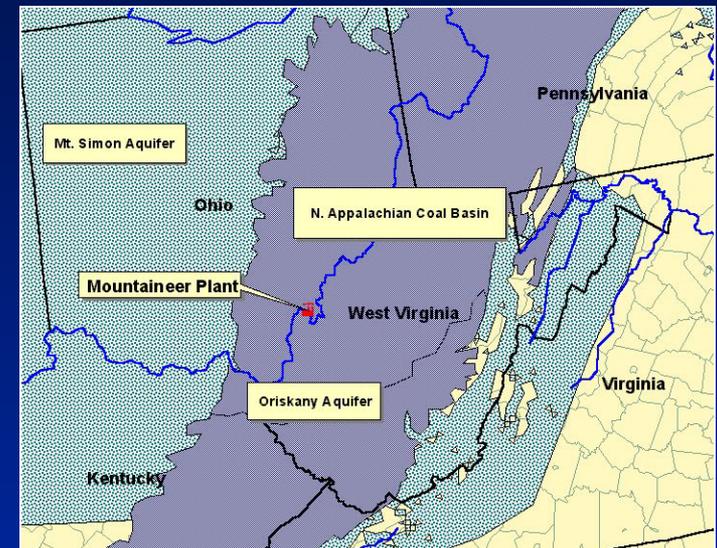
Started in November 2002.

Program concentrates on CO₂ mitigation via a number of technologies and CO₂ sequestration.

Large program amounting to 225 M\$ over 10 years.

Field experiment–Batelle/DOE

- Schlumberger partnership (via wireline logging, interpretation)
- BP, American Electric Power, Ohio coal office, U. Texas
- CO2 injection experiment for storage evaluation
 - Well at a power plant, Ohio R., W. Virginia
 - 11000 ft, 2D seismic survey prior to drilling
 - Wireline logging over ENTIRE depth
 - Complete interpretation package



The Schlumberger / TFE / IPG Proposal

- Cofunded by Schlumberger and TFE
 - 400 K \$/ y, 4 years commitment
- IPG strengths
 - Geochemistry, carbon cycle, tracers
 - Storage in carbonates and hydrates
 - Gravity, magneto-telluric methods, modeling
- One director + secretary
 - would fund projects inside IPG and other institutions (including IFP)
- Concentrate first on storage in carbonates

DOE sponsored BEG project in Texas

DOE sponsored BEG project in Texas.

Again, multifaceted team participation is involved. Our research center is playing an advisory role, and Schlumberger wireline services are being sought. In this project, a pilot injection study is being pursued with dedicated monitoring wells. Our technology is vital to this kind of an activity. The CO₂ injection is in the Frio formation about 5000 ft deep.

The Way Forward

Because of Schlumberger's current business expertise, there appears to be relatively little risk for us in preparing to play a major role in the future of CO2 Sequestration.

However, the gigantic shift we foresee will produce significant opportunities, many other companies having the initiative, foresight, and vision will benefit greatly from taking a similar approach.